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Foodborne outbreaks are common in Cambodia, but only a few investigating documents have been conducted due to the poor public awareness and the lack of scientific report. The objectives of this study were (i) to identify and evaluate the contamination rate of microbial hazards in fermented vegetable and fish products in Cambodia, (ii) to determine histamine level in fermented fishes as well as histamine producing bacteria, and (iii) to define targets for control histamine producing bacteria through starter culture (LAB). Total 128 samples including fermented vegetables (60 samples) and fermented fishes (68 samples) were purchased randomly from 5 wet markets in Cambodia from March 2014 to July 2014. In this study, *E. coli, Cronobacter sakazakii, shigella* spp. *Enterobacter* spp., other Opportunistic *Entrobacteriaceae*, Opportunistic *Non-Entrobacteriaceae, Vibrio* spp., *Enterococcus* spp., *Aerococcus* spp., *Staphylococcus* spp., *Listeria* spp. and *Bacillus cereus* were found in both fermented foods. The contamination rates in both categories of fermented foods were different, especially for *Enterococcus* spp. Coliform bacteria, *Enterococcus* spp., *Staphylococcus* spp. and *Bacillus cereus* in fermented fishes were significantly higher than in those fermented vegetables. Twelve samples (20%) of fermented fishes exceeded the Food Standards Code (FSC) maximum permitted level (200 ppm) for histamine. *Enterobacter aerogenes* was identified as potential histamine producing bacteria in fermented fishes. Initial pH of fermentation and fast-growing lactic acid bacteria as starter culture play an important role for control histamine producing *Enterbacter aerogenes* as well as other *Enterobacteriaceae*. In this case, the combination of initial pH (6.0) with *Lactobacillus pentosus* or pH (5.0) with *Lactococcuslactis* ssp. *lactis* are able to suppress the growth of *Enterobacter aerogenes* and minimize the content of histamine at below FSC.

The results in this works could be information of bacterial contaminants in Cambodian fermented foods that should be prevented and reduced in the future. The quality of the raw material and good hygiene practices in food facility should be required to improve food safety in Cambodia. The strategy of target suitable starter cultures under optimal initial pH of fermentation indicated positive result to reduce poisoning histamine in final fermented foods.

Keywords: Fermented vegetables, fermented fishes, hazardous bacteria, histamine, histamine producing bacteria, Lactic acid bacteria, initial pH of fermentation, biological control, Cambodia.